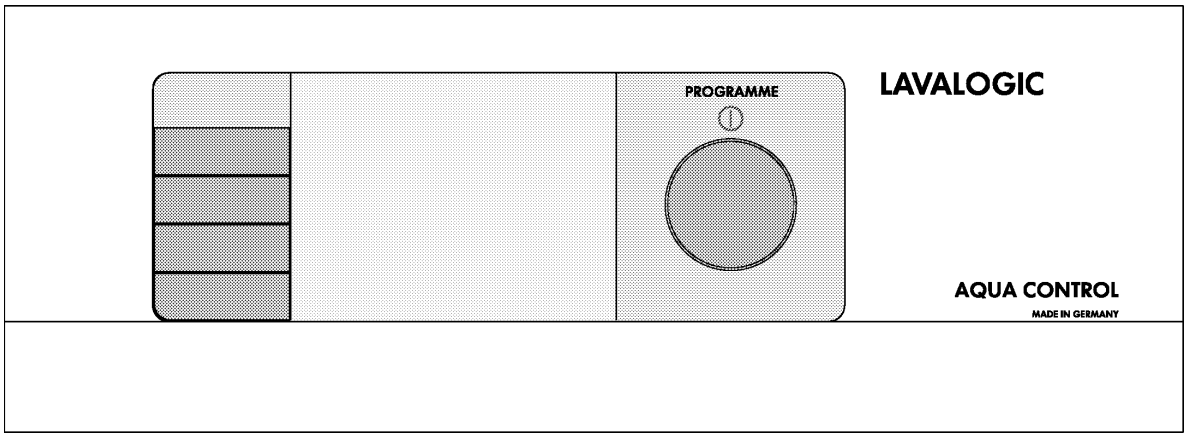
Electrolux

SERVICE MANUAL

Washing



(c) AEG Hausgeräte GmbH
Muggenhoferstr. 135
D-90429 Nürnberg
Germany

Fax +49 (0)911 323 1420

Spares Operation
HV844-N
Edition: 03/2003

Publ.Nr.:
599 51 57-87
685
EN

Frontloading washing machines

EWM 3000 LCD

Index

1. Operation of the device 3
1.1 Control panel 3
2. Aqua control system 4
2.1 General construction 4
2.2 Floating switch 4
3. Water intake system 5
3.1 Waterdistributer + valves 5
3.2 Drawer 6
4. Components 7
4.1 Electromagnetic door lock (IDOLO) 7
4.1.1 Door lock function 7
4.2 The pressure sensor 8
4.2.1 Function of the pressure sensor 8
4.3 The NTC sensor 9
4.4 The heating element 9
4.5 The drain pump 10
4.6 The recirculation pump 10
4.7 The inlet valves 11
4.8 The motor 11
5. Motor control (Puls width modulation) 12
5.1 Signals from the main electronic board to the motor electronic 12
6. Customer service program 13
6.1 Activating the service program 13
7. Demo mode 14
7. Demo-Mode 14
7.2 Deaktivieren des Demo-Modes 14
7.1 Activating the demo mode 14
7.2 Deactivating the demo mode 14
8. Faultindication 15
8.1 Fault classification 16
9. Technic 17
9.1 Wiring 17
9.2 Circuit diagram 18
9.3 Legend 19
10. Program workflow 20
11. Service- notes 21
11.1 Dismounting the control panel 21
11.2 Dismounting the LCD operating part 22

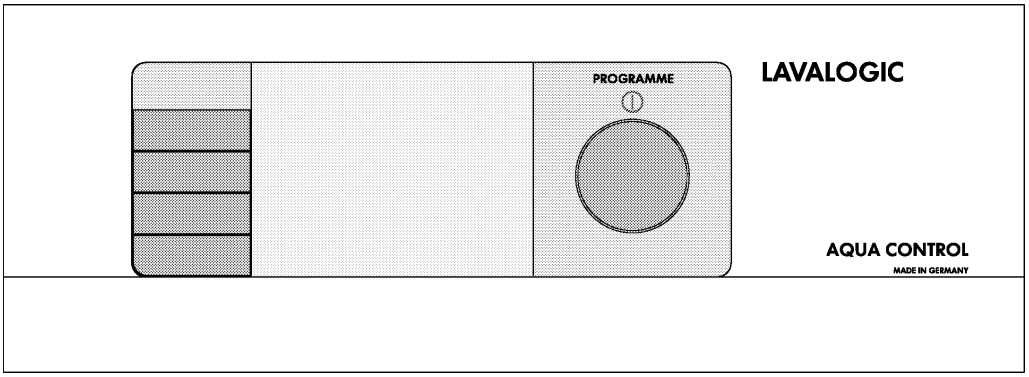
1. Operation of the device

- The appliance is provided with a control knob with integrated ON/OFF switch. Press down the control knob to switch the appliance on or off.

- When you switch on, the control knob is extracted from its retracted position. For switching off, press the control knob back to its retracted position.

Keys LCD display Control knob

1.1 Control panel



2. Aqua control system

2.1 General construction

- Safty hose with a „normal“ pressure hose inside, without integrated electrical connection between the machine and the water tab valve.
- Hose system is all around closed and watertight
- At the water tab is a „mechanic“ safty valve without electric connection
- The hose is connected at the water inlet valve
- In case of a fault, that means the inner hose is leaking, a sponge as a part of the mechanic safty valve expands and closes the valve at the water tab.
- The water inlet valve with a flow regulator is positioned in the machine.
- There is no need for for special AC water distributer or valves.

2.2 Floating switch

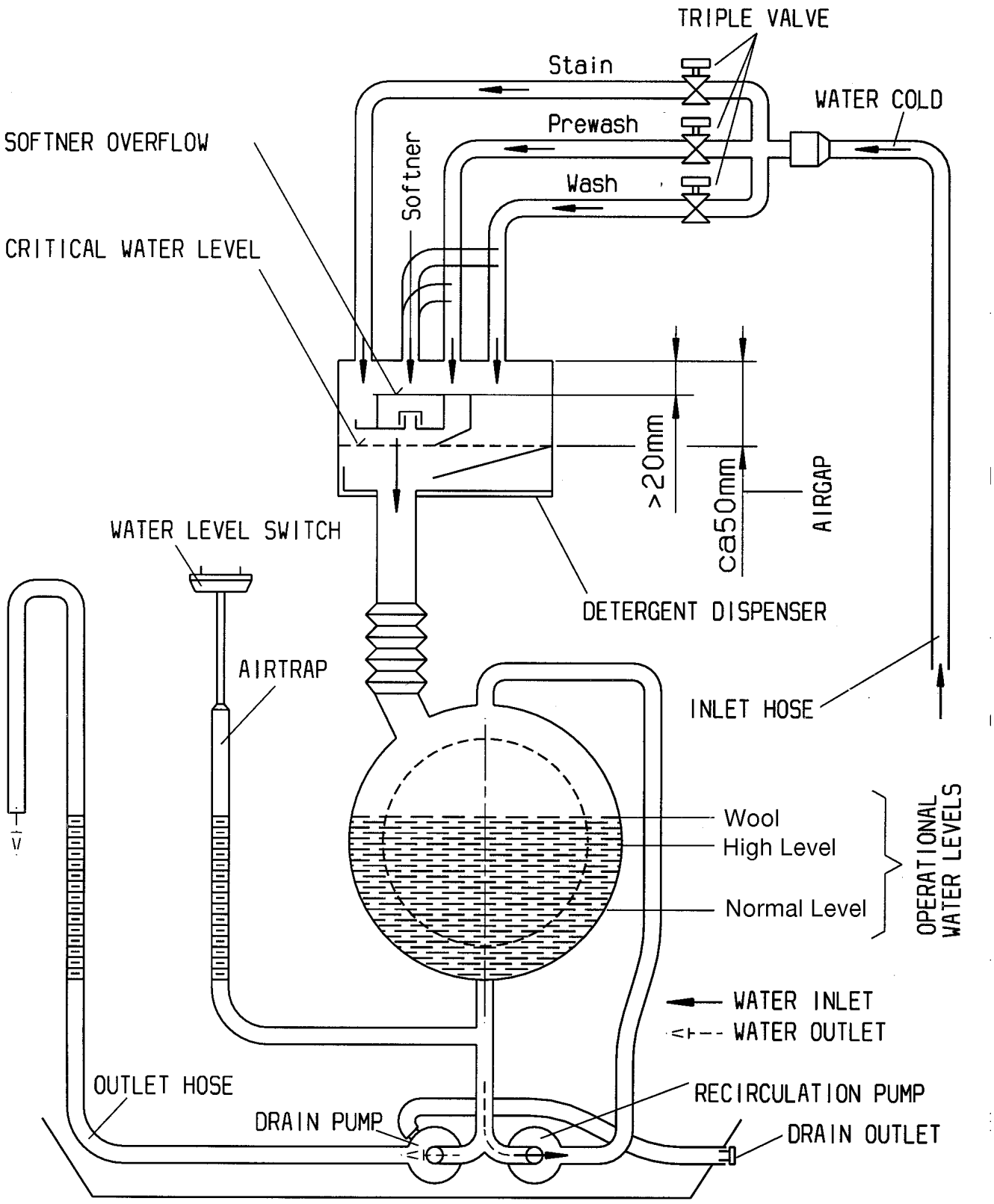
- Aqua-Control is generally with buzzer
- There is no need for a special electronic concerning AC

Floating switch f16 with 2 alternating contacts:

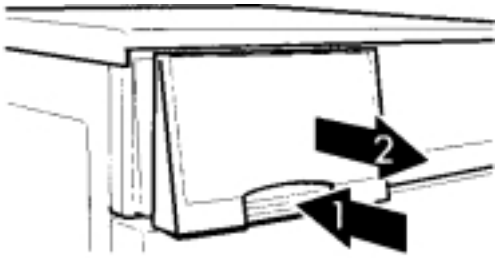
- Switches on the pump - the pump has direct voltage.
- Electronic recognizes the opened pump contact and therefore the AC- case.
- The fault code „C3“ is shown.
- At this position the program stops.
- If the floating switches back the machine stops pumping.

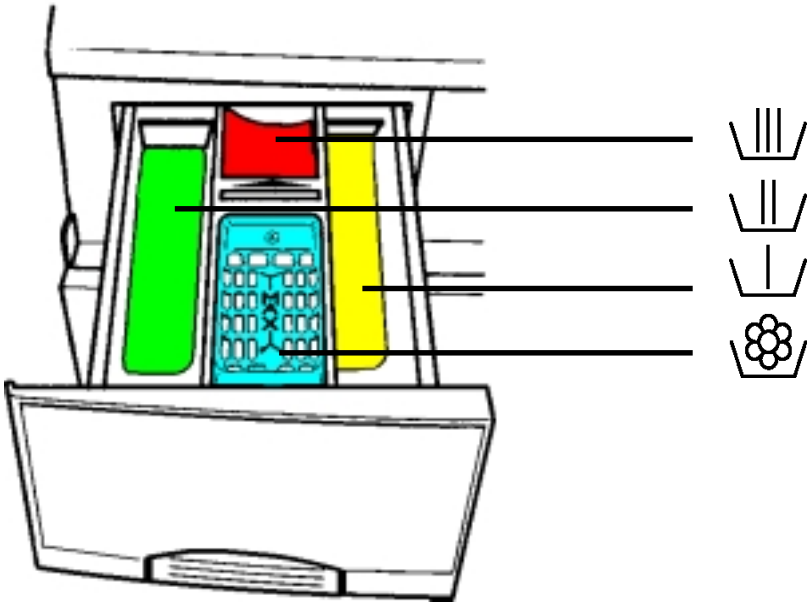
3. Water intake system
3.1 Waterdistributer + valves

- 4 detergent chambers; recirculation pump and drain pump
- 4- way waterdistributer
- 3 valves



3.2 Drawer





Compartment for **prewash** powder/**soaking** powder or **water softener**
Will be taken in at the very beginning of the program
Active valve: S1

Compartment for the **main wash** powder.
Will be taken in at the beginning of the main wash.
If you like to use water softener and the right compartment is filled with prewash or soaking powder, add the water softener to the washing powder.
Active valve: S2

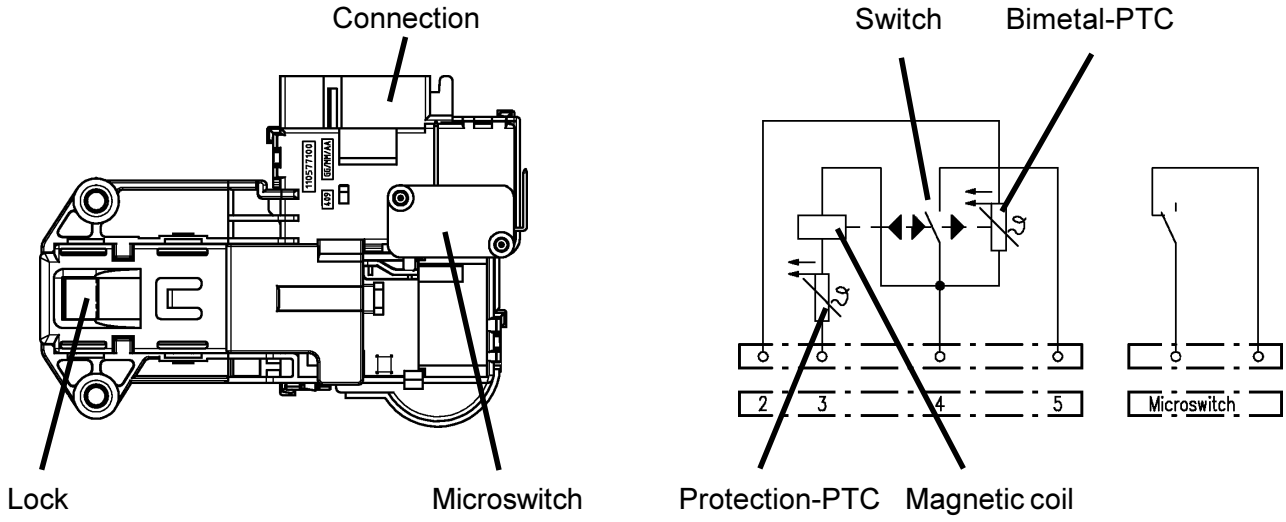
Compartment for the **spot** powder.
The intake is delayed during the main wash.
Active valve: S15

Compartment for the **liquid softener** or **starching powder**
Intake at the last rinse.
Caution: Fill the compartment not over the mark maximum. Dilute high viscidity fluids.
Active valves: S1+S2

4. Components
4.1 Electromagnetic door lock (IDOLO)

- Electromagnetic door lock with additional door switch. This switch is able to recognize the door's status of locking, thus controlling also drum lighting.

- You can see from the displayed symbol on the screen if the door can be opened during the cycle being in process.



4.1.1 Door lock function

Door locking is controlled directly from the control electronics. For enabling the lock, one impulse is necessary, for disabling the lock, two impulses. You can recognize these control impulses at the door lock as a simple or double clicking sound.

Prerequisites for door opening:

- Drum is at standstill (no signal from tachometer generator)
- No water may be present above the lower door rim (level <fN2)
- Water temperature may not exceed 40°C.

Automatic unlocking device:

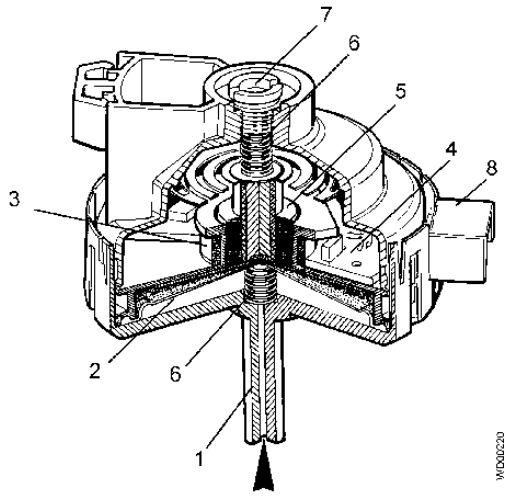
- if the appliance is switched off or disconnected from the mains, the PTC bimetal will cool down, and after about 1-4 minutes, the locking mechanism will be disabled.

Safety function:

- A PTC is switched in series to the magnetic coil to limit power and therefore avoid possible overheating due to the following causes:

- TRIAC is short-circuited on the control electronics
- Repeated activation of the Start/Pause key (more than 10 times)

4.2 The pressure sensor

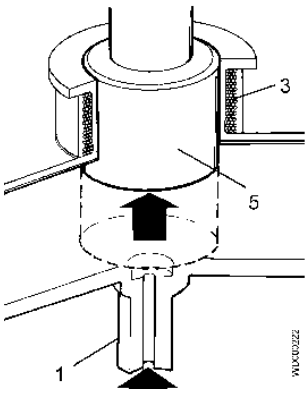


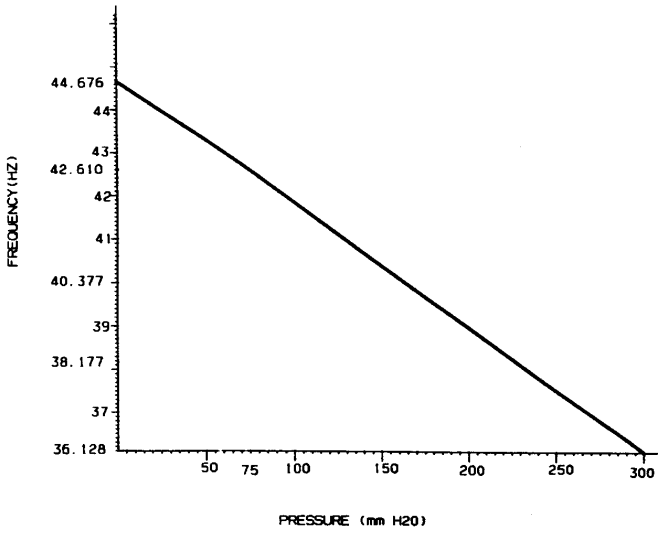
1	Air inlet
2	Membrane
3	Coil
4	Oscillator
5	Magnetic ring
6	Spring
7	Screw to adjust
8	Connector

4.2.1 Function of the pressure sensor

- Via the air inlet the water pressure moves the membrane.

- The membrane moves the magnetic ring (5) into the coil (3). Then the oscillator puts an other frequency on the main electronic. The water level is recognized.

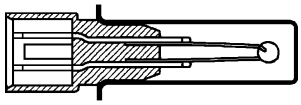




PRESSURE (mm H20)	FREQUENCY (Hz)
0	44.676
75	42.610
300	36.128

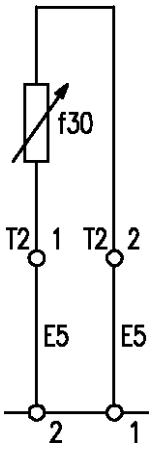
4.3 The NTC sensor

The electronic controls the drain temperature by a NTC temperature sensor which is integrated in the heating element.



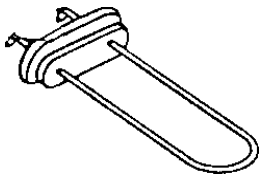
NTC-sensor f30:

°C	Ω
20	6050
60	1250
80	640



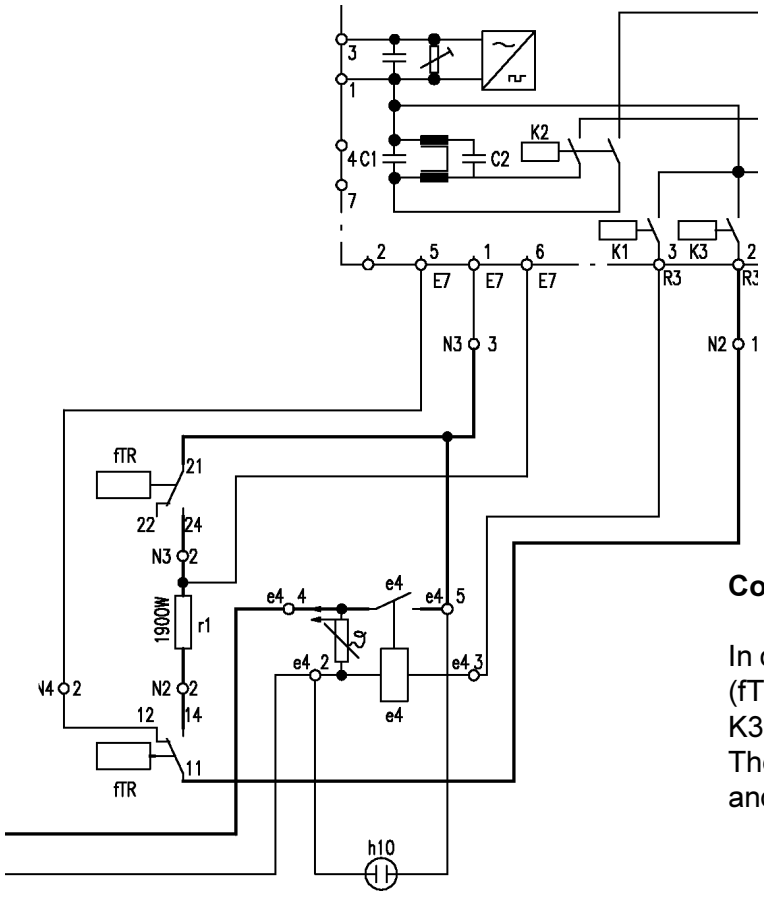
- To check the NTC sensor functionality you can measure the ohmic resistance between the contacts T2/1 and T2/2.

4.4 The heating element



Heating element:

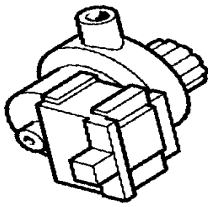
Connection:	230V; 50 Hz;
Power:	1950W
Fuse:	10A



Control of heating element (r1):

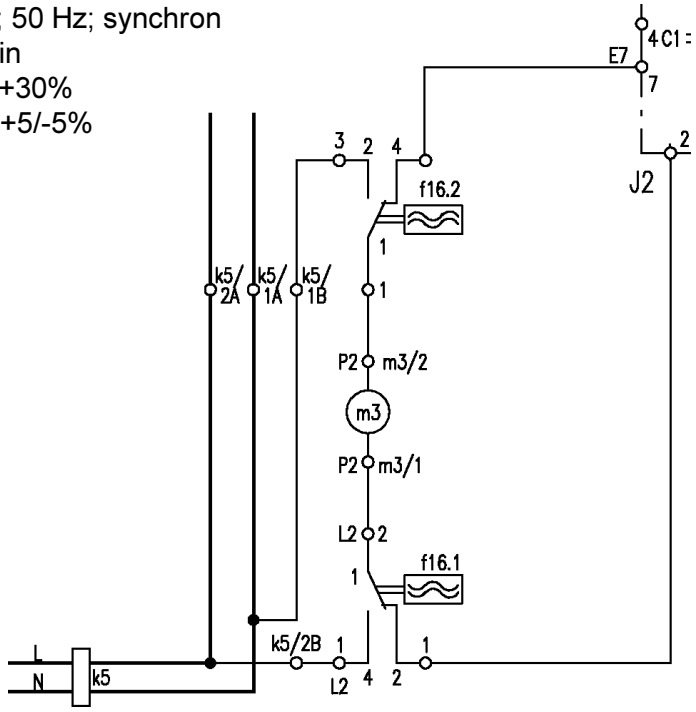
In order to heat, the dry-running protection level (fTR1,fTR2) must be achieved. The heating relay K3 on the electronic has to be closed.
The appliance must be switched on (b7/DW) and the door locked (e4).

4.5 The drain pump



Drain pump:

Connection:	230 V; 50 Hz; synchron
Flowrate:	22 l/min
Power:	34 W +30%
Resistance:	164Ω +5/-5%

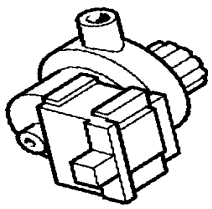


Pump control (m3):
In order to pump, the appliance must be switched on (b7/DW), the safety level and the floating switch have to be in empty position. The electronic controls the pump by a triac, depending on the program.

In case of aqua control the floating switch is in full position and the drain pump is active until the plug is pulled or the water is removed out of the bottom tray.

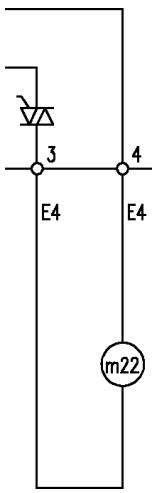
The appliance would even pump when the appliance is switched on and the safety level (fS) has reacted. Over-filling protection!

4.6 The recirculation pump



Recirculation pump:

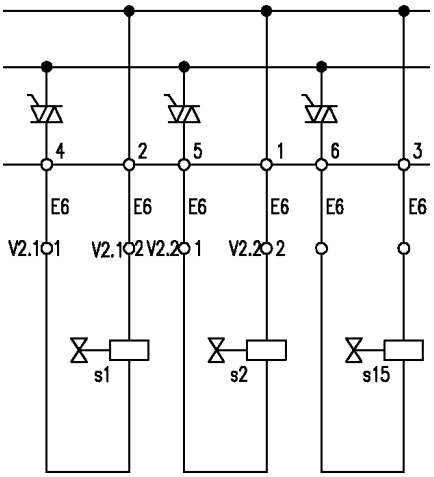
Connection:	230 V; 50 Hz; synchron
Flowrate:	25 l/min
Power:	22 W +30%
Resistance:	202Ω +5/-5%



Recirculation pump control (m22):
The recirculation pump is powerde by a triac located on the main electronic board depending on the program cycle.

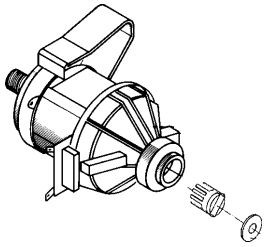
4.7 The inlet valves

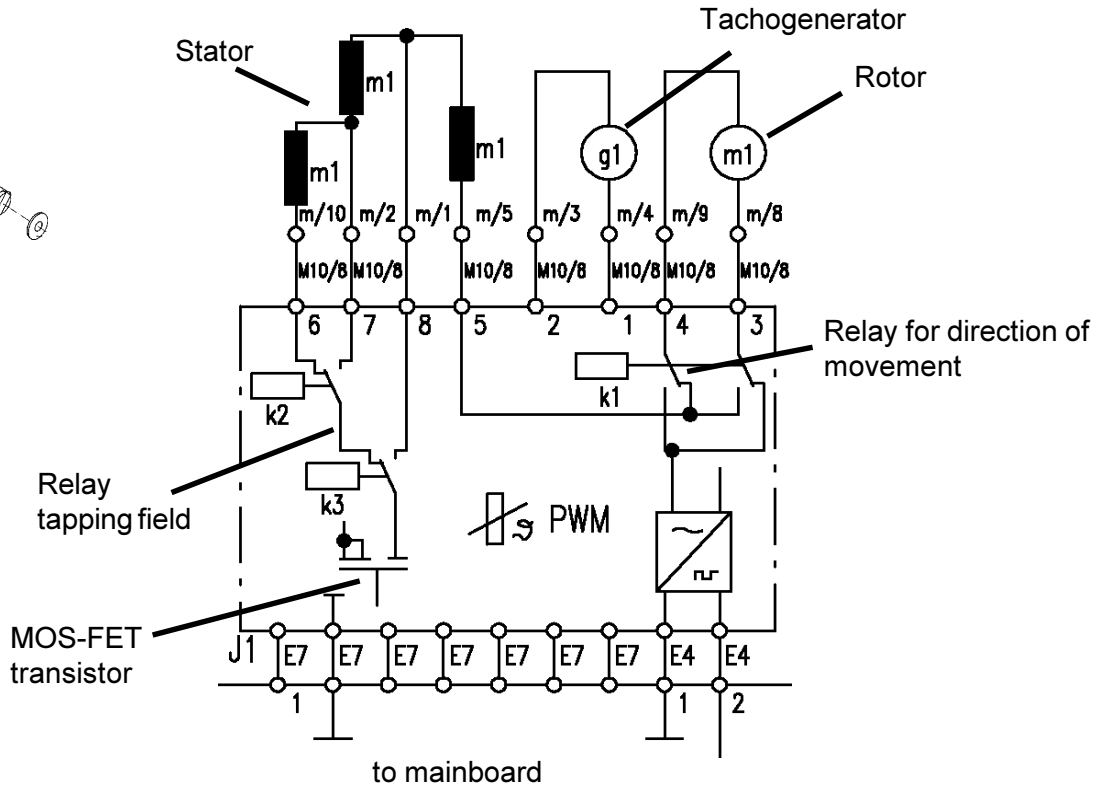
Inlet valve:
Connection: 220/240V +6-15%; 50 Hz;
Pressure: 0,6 – 10 bar
Flowrate: 8 l/min



Inlet valves (s1,s2,s15):
The valves are powered by a triac located on the main electronic board depending on the program cycle.

4.8 The motor

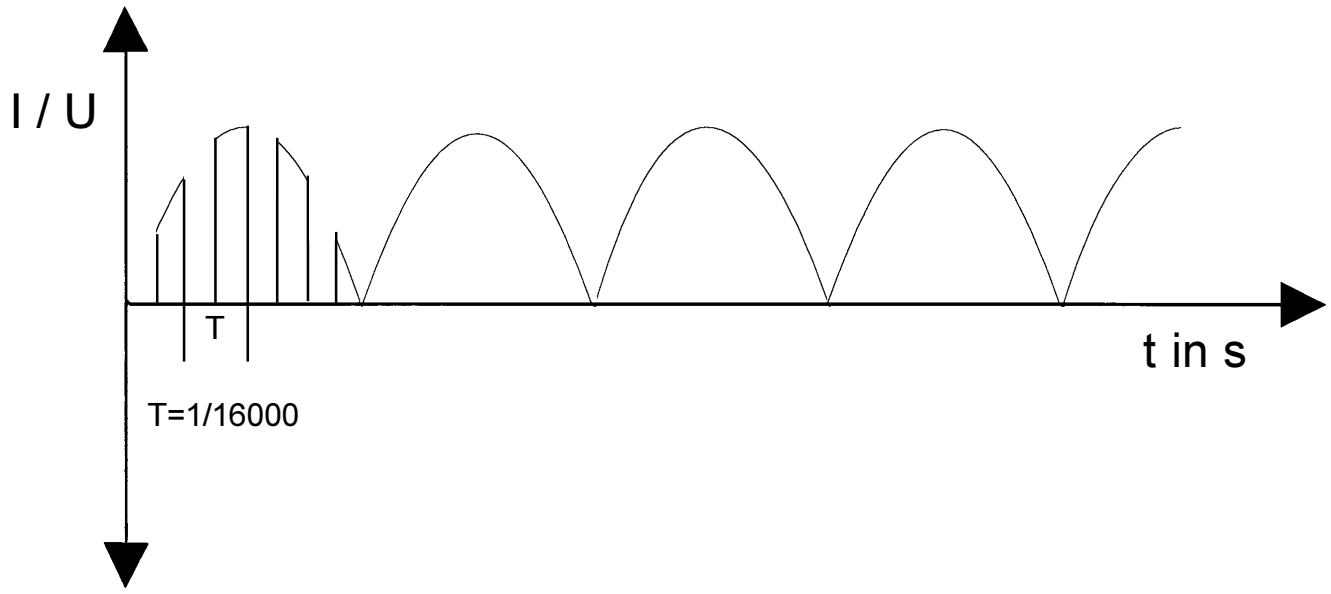




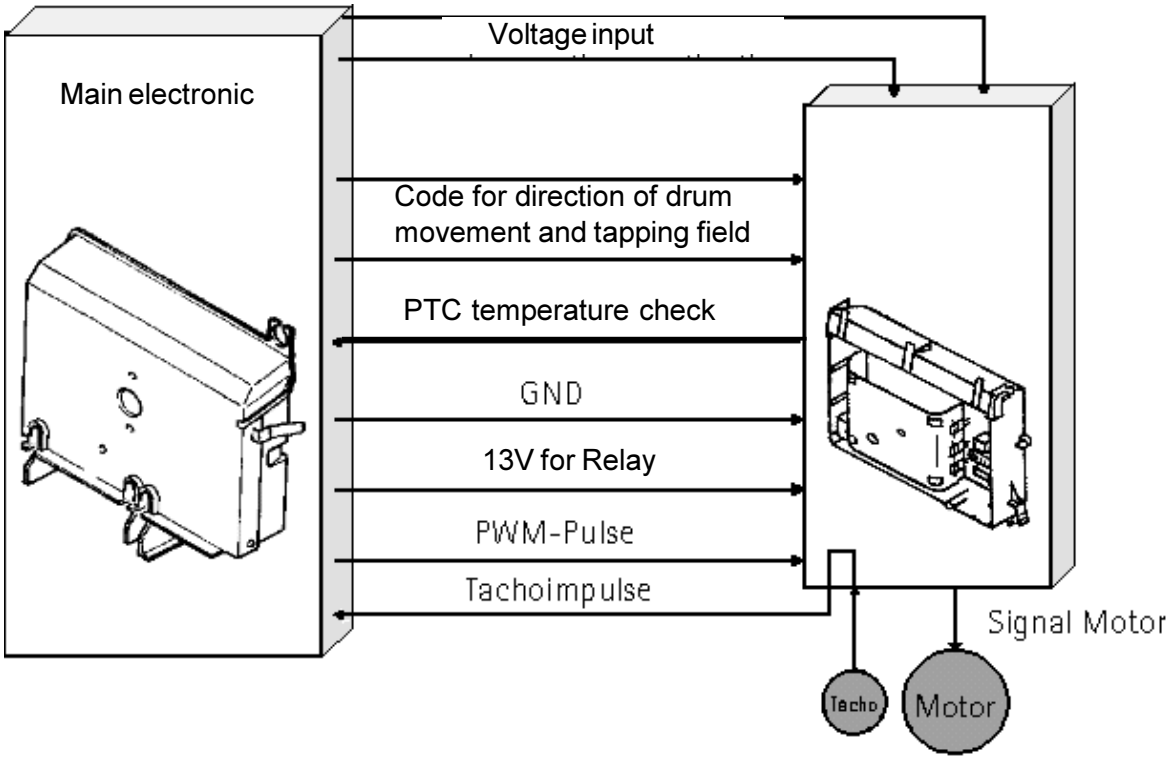
Sachnummer	Anschlusswert	Tacho (3-4)	Rotor (8-9)	Stator (5-1)	Stator komplett (5-10)
110 536 1.. FHP	230V; DC	223Ω +/-8%	1,45Ω +/-8%	1,00Ω +/-8%	2,50Ω +/-8%
110 536 4.. FHP	230V; DC	223Ω +/-8%	1,45Ω +/-8%		2,50Ω +/-8%

5. Motor control (Puls width modulation)

- The motor is controlled with a pulsing DC, frequency 16kHz.
- The revolution is controlled with the switch on- and off time of the DC.
- Smallest possible switch-off time is 2 %.



5.1 Signals from the main electronic board to the motor electronic



6. Customer service program

6.1 Activating the service program

- Turn the appliance off with the Control Knob S1 (retracted position).

- Press simultaneously keys 1 and 2 and switch the appliance on with the Control Knob. Keep both keys pressed until the Service Program appears in the display.

- To select the different service functions, regulate the control knob to the desired position, as when selecting a wash cycle.

Test function	
ALARM CODE CLEAR	Last error code occurred will be cleared down
**********	Not assigned
**********	Not assigned
**********	Not assigned
**********	Not assigned
LCD TEST	Display Test
LANGUAGE	Language
DRAIN	Evacuation
HEATING / WL	Water intake via main wash compartment up to fN2, heating up to 89°C, recirculation pump ON, reversing
ALARM CODE READ	Last error code occurred will be displayed
WL MAINWASH	Water intake via main wash compartment (up to fS)
**********	Not assigned
WL SOFTENER	Water intake via softener compartment (up to fS)
**********	Not assigned
**********	Not assigned
WL PREWASH	Water intake via prewash compartment (up to fS)
WL MAINWASH	Water intake via main wash compartment (up to fS)
WL STAIN	Water intake via stain compartment (up to fS)
R (L2/L27/-)	Reversing
SPIN COMPL. FIELD	Spin dry with complete field (possible only after evacuation)
**********	Not assigned
SPIN HALF FIELD	Spin dry with partial field (possible only after evacuation)

7. Demo mode

With appliances as from serial number 306… a demo mode is available.
In this mode the setting options and a program flow will be simulated.

7.1 Activating the demo mode

- Turn off the appliance with rotary switch S1 (sunk-in position).
- Push buttons 1 and 4 at the same time and turn on the appliance with the rotary switch. Hold both buttons until the demo mode starts.
- The demo mode runs automatically and can't be modified.

7.2 Deactivating the demo mode

- Turn off the appliance with rotary switch S1.

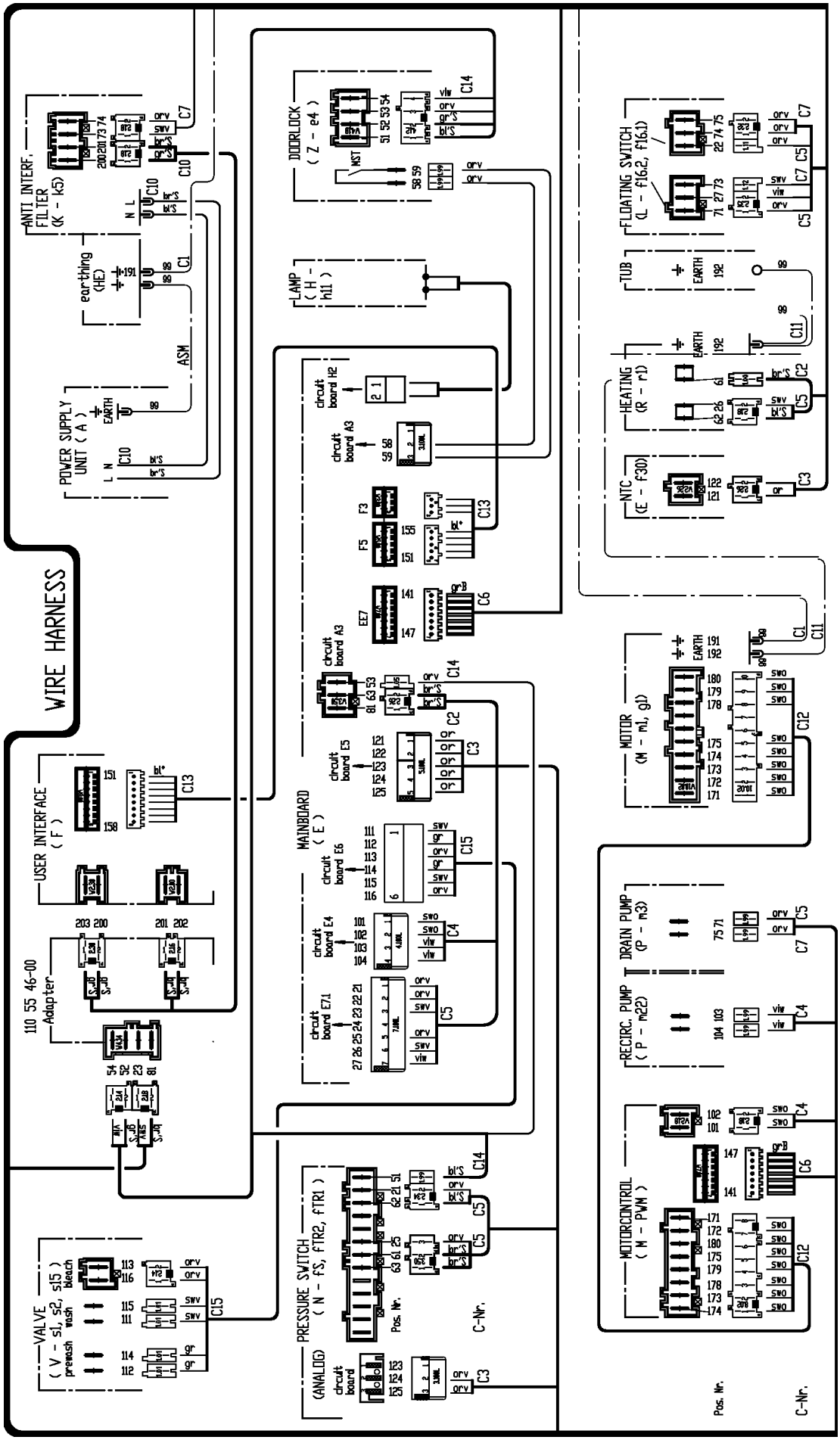
8. Faultindication

Type of Fault		Procedure with fault finding	Classifi-cation	Time
C0	-incongruence between pressure - sensor and pressure switch -heating element defective	-check heating element -check pressure switch -check pressure sensor -check wiring	**1**	**S**
C1	-no water inlet -valve does not open/ interruption -flow rate too low	-check water inlet -clean sieve -check inlet valve -check pressure sensor -check wiring	**1**	**S**
C2	-pump blocked / does not function -pump interruption -reduced delivery	-check pump -check drain system -check pressure sensor -check pressure switch -check wiring	**1**	**S**
C3	-aqua control has responded -leakage in appliance	-hose screwing leaky -leakage in appliance -check drain pump -check float switch -check wiring	**2**	**S**
C4	-circulation pump defective	-check circulation pump -check wiring -exchange main-electronic	**2**	**S**
C5	-----	-----	**-----**	**-----**
C6	-pressure sensor defective -pressure switch defective	-check pressure sensor -check pressure switch -check wiring	**1**	**S**
C7	-heating element defective -heating relay defective	-check heating -check heating relay -check pressure switch -check NTC -check wiring	**1**	**E**
C8	-NTC defective	-check NTC -check wiring	**1**	**E**
C9	-tachometer impulses are missing	-check drive motor -check carbon brushes -check tacho generator -check wiring	**1**	**E**
CA	-MOS-FET transistor defective	-exchange motor-electronic	**3**	**S**
CB	-5 x safety level	-check inlet valves -check pressure switch -check wiring	**1**	**E**
CC	-PTC for MOS– FET transistor defective	-check wiring -exchange motor-electronic	**1**	**S**
CD	-door-lock defective	-check door-lock -check wiring	**1** **1**	**S** **E**
CE	-----	-----	**-----**	**-----**
CF	-checksum-fault EEPROM	-wrong i/o- or main- electronic -update faulty -wrong update	**1** **1**	**S** **E**

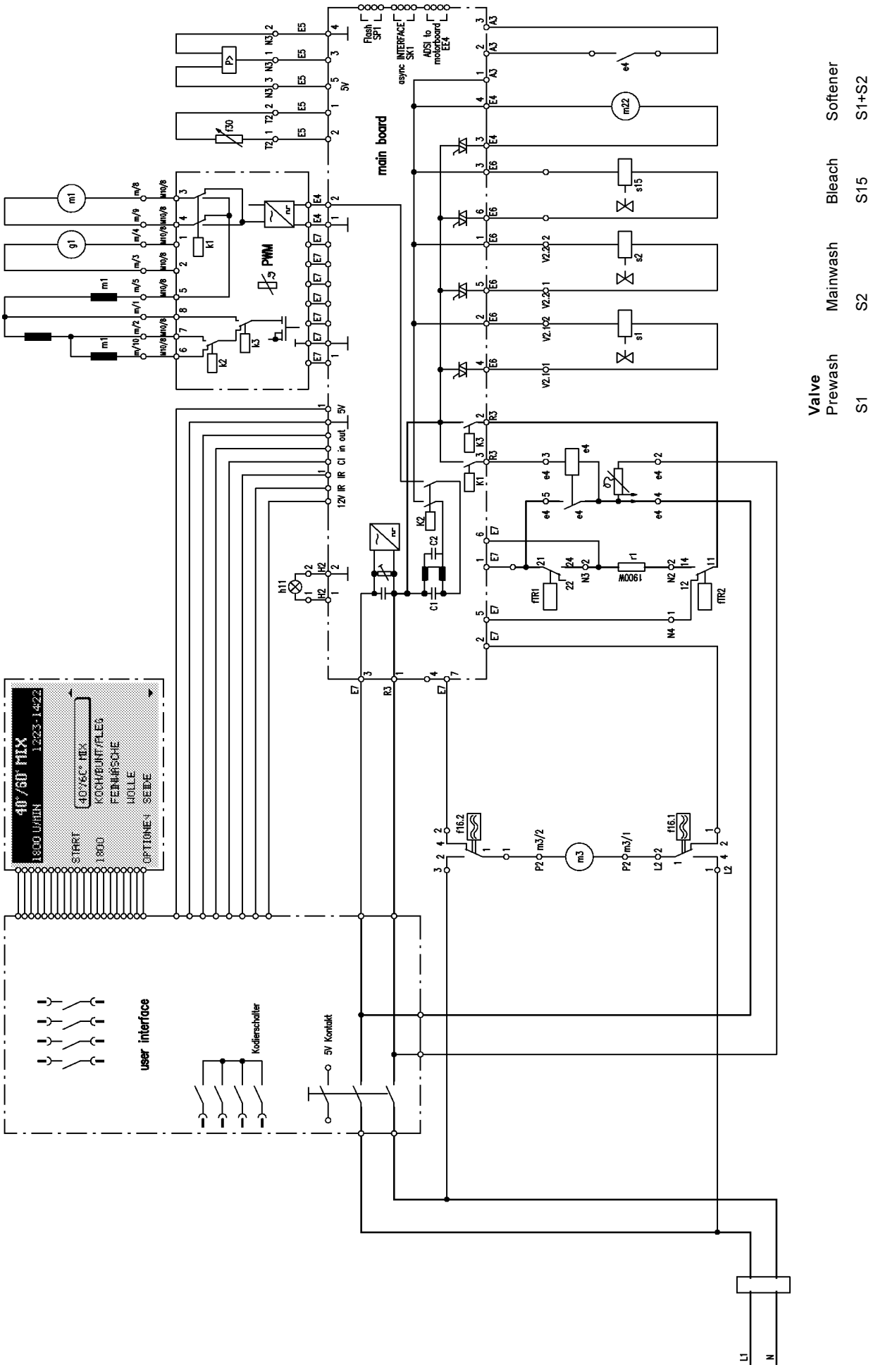
8.1 Fault classification

Composition of Alarm Codes			
Classification		**Time of Indication in the display**	
0	Fault code is not indicated Fault code is saved in fault register No program interruption	**S**	immediately, program stops
1	Fault code is indicated Program run is interrupted **Fault can be reset by customer:** Start/pause button resets alarm and program continues. Switching off appliance resets the alarm and appliance is ready for operation again.	**E**	at the cycle end
2	Fault code is indicated Program run is interrupted **Fault cannot be reset by customer.** Alarm is reset automatically when fault is removed. Start/Pause button continues program.	**P**	only in the test routine
3	Fault code is indicated Program run is stopped **Fault can be eliminated only by after-sales service.** Appliance is ready for operation again only by activating test routine.		

9. Technic
9.1 Wiring


WIRE HARNESS
ANTI INTERF. FILTER (K - k5)
earthing (HE)
POWER SUPPLY UNIT (A)
ASM
LAMP (H - h11)
DOORLOCK (Z - e4)
FLOATING SWITCH (L - f16.2, f16.1)
TUB
HEATING (R - r1)
NTC (E - f30)
MOTOR (M - m1, g1)
DRAIN PUMP (P - m3)
RECIRC. PUMP (P - m22)
MOTORCONTROL (M - PWM)
MAINBOARD (E)
USER INTERFACE (F)
VALVE (V - s1, s2, s15)
PRESSURE SWITCH (N - FS, FTR2, FTR1)
(ANALOG)
110 55 46-00 Adapter
circuit board A3
circuit board H2
circuit board E5
circuit board E6
circuit board E4
circuit board E7.1
Pos. Nr.
C-Nr.

9.2 Circuit diagram



9.3 Legend

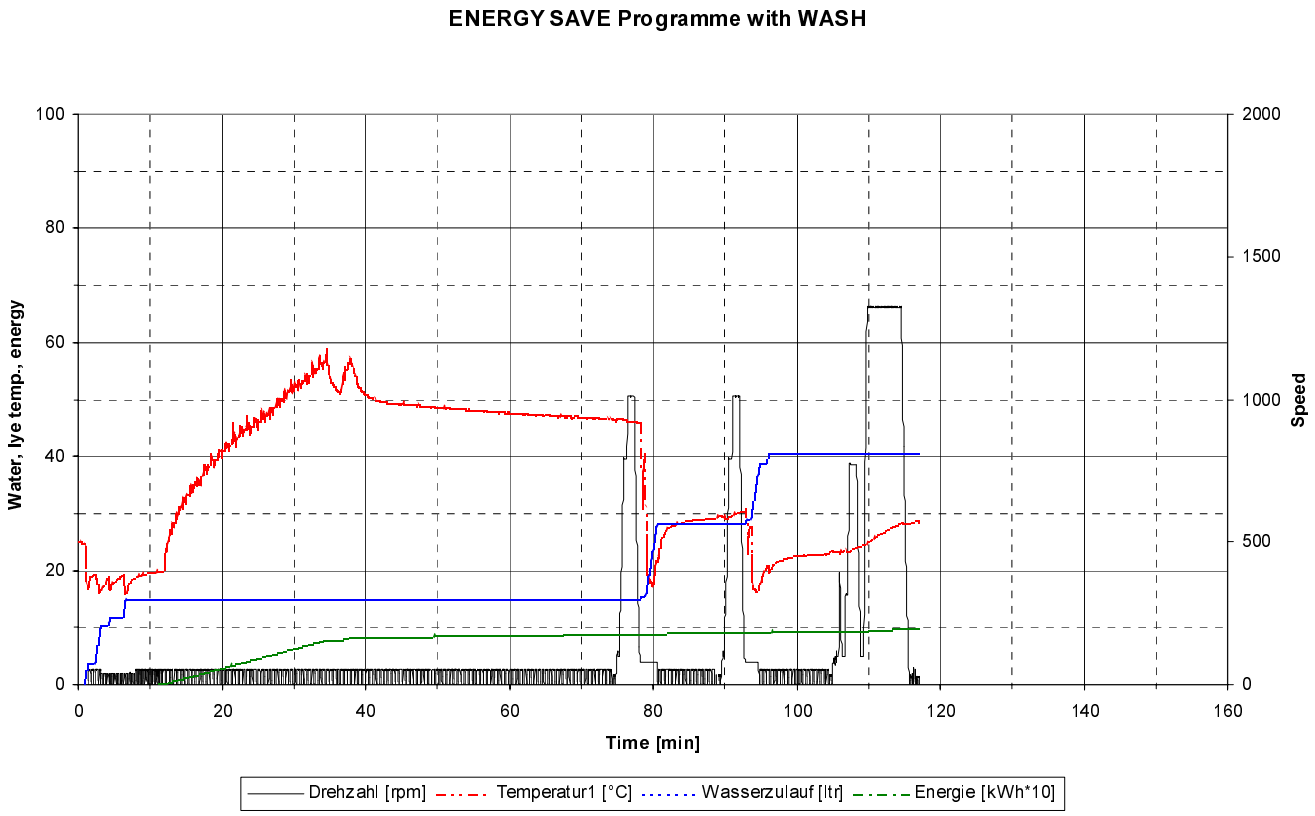
Legend wiring plan

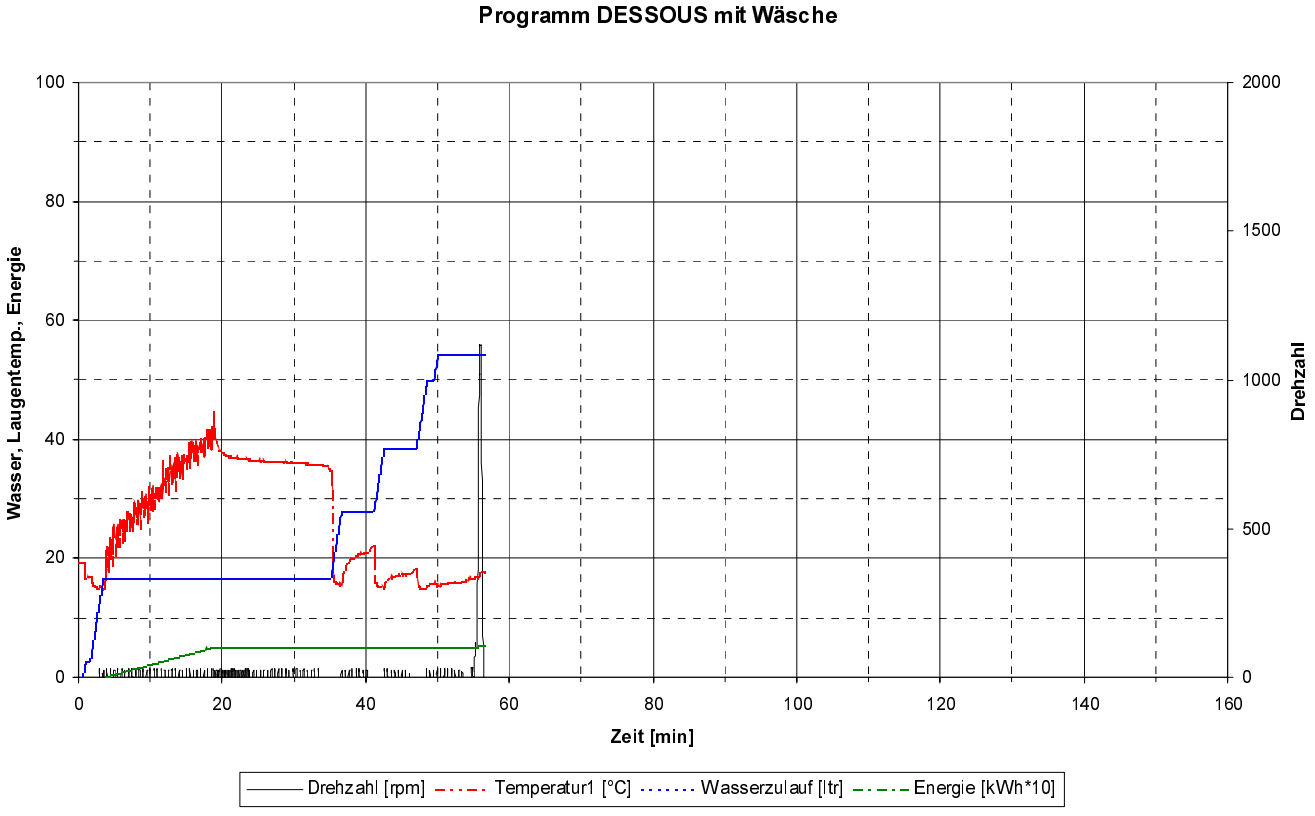
Short name	Description	Description in the wiring plan
A	Connection housing	
C	Selection switch	b7/DW
E	NTC - Sensor	f30
E	Main electronic	
F	In / Output electronic	S17
H	Lamp	h11
HE	Main earth	
K	Suppressor	k5
L	Floating switch	f16.1 ; f16.2
M	Motor	m1
M	Motor electronic	PWM
N	Pressure switch	fs;fTR2;fTR1
N	Pressure sensor	p
P	Recirculation pump	m22
P	Pump	m3
R	Heating	r1
V	Valve	s1;s2;s15
Z	Door lock	e4

Legend circuit diagram

b7 / DW	Selection switch
e4	Door lock
E	Main electronic
f16.1 f16.2	Floating switch
f 30	NTC - Sensor
fS	Safety level
fTR1 ; fTR2	Boil-dry protection
g 1	Tacho generator
h11	Lamp
k1	Direction of drum movement
k2 k3	Tapping / complete field
k 5	Suppressor
m 1	Main motor
m 3	Drain pump
m22	Recirculation pump
p	Pressure sensor
r1	Heating element
s1 s2 s15	Valve
s17	In / Output electronic

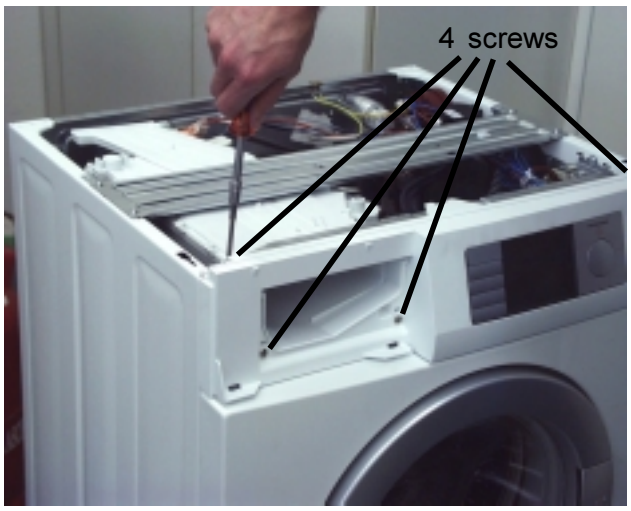
10. Program workflow





11. Service- notes
11.1 Dismounting the control panel

a) The countertop is fixed with 2 screws to the back of the appliance. Unscrew both screws and remove the countertop to the back.



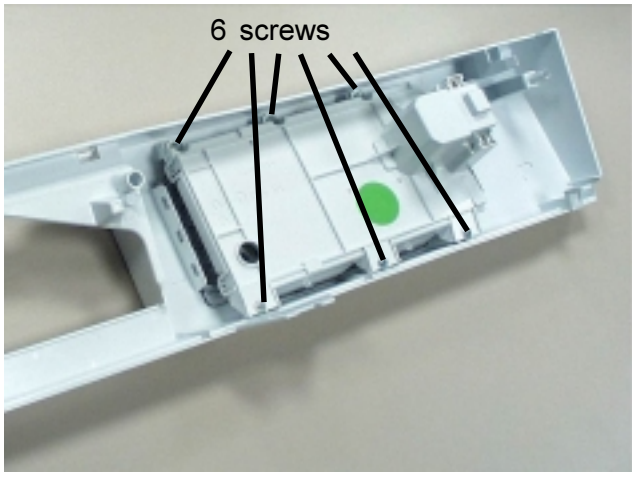
b) Pull out the detergent drawer.

c) Turn out the two upper screws and the screws behind the drawer.

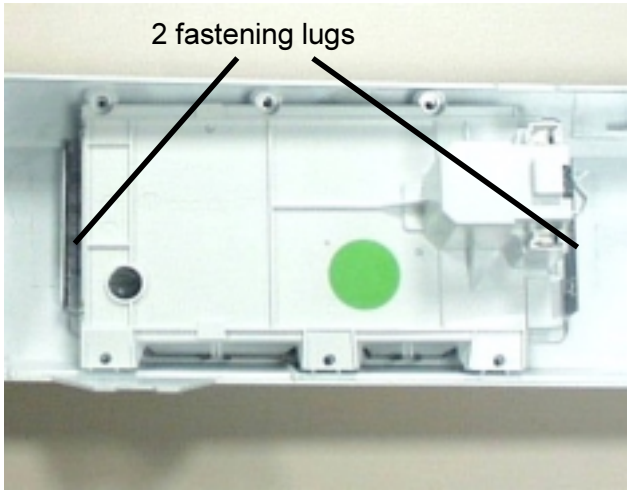
d) Remove the control panel to the front and unplug the plug-in connectors.

11.2 Dismounting the LCD operating part

e) The LCD operating part is fixed to the face with 6 screws.
Unscrew the screws and lift the operating part off upward.



f) Press the two side fastening lugs slightly apart, and lift the operating part off.



g) The operating face is locked with 2 fastening lugs at the top, and at the bottom, with 3 fastening lugs.

Unlock the fastening lugs and remove the control face along with keys.

You can now take off the keys and unplug the control knob.